Computer & Communications Industry Association

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December 4, 2001

The Honorable J. Frederick Motz
Chief Judge
United States District Court for the
District of Maryland
101 West Lombard Street
Baltimore, Maryland 21201

Dear Judge Motz:

I have written to you previously on behalf of the Computer & Communications Industry Association (CCIA), to express my concerns with the proposed settlement in the *Microsoft/MDL* case before the district court. In addition to the anticompetitive impact of the settlement that I highlighted in my previous letter, I wanted to provide you with additional information regarding the proposed settlement's potential to interfere with the adoption of advanced technology and network-based curricula in American schools.

As we described in the enclosed white paper released earlier this year, district-based school systems are increasingly adopting a network-based technology structure that leverages the advantages of networked computing, which melds very well with the prevailing administrative structure of America's school systems. We believe that by focusing technology infrastructure and curriculum integration at the district level rather than in individual classrooms, our schools can leverage the power of modern communications and computing to allow teachers to concentrate on teaching, and network administrators to take care of computer networks.

However, among the many shortcomings of the proposed settlement is that it would discourage this paradigm and promote the outdated model of PC-based, classroom-administered technology in schools. While certainly these services can provide some assistance to students and teachers in their curricula, our white paper points out that more logical and effective systems are now available and offer greater benefits. We believe that it is improper for any proposed legal settlement designed to benefit students and schools to impede the adoption of the most advanced technology configurations and curricula.

Again, I strongly urge you to reject this settlement and permit the plaintiffs to seek meaningful relief that will deter Microsoft's illegal anticompetitive tactics in the future. Imposition of this settlement will not only retard competition in our industry, it will likely perpetuate an inefficient, outmoded technology model for the nation's educational system.

Sincerely,

E J Black

Edward J. Black
President and CEO

Enclosure

A Report by the Computer & Communications Industry Association

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The Federal Role in Education:
Promoting Internet Technology to Advance Learning Opportunities

May 2001

Introduction

For decades, our nation has struggled with the reality that our education system is not meeting the high standards we are capable of achieving for all of our citizens. Stakeholders from all corners have strong ideas and opinions about what can and should be done to improve the system. This is a healthy debate, and the Computer & Communications Industry Association (CCIA) congratulates both President Bush for putting education first on the public policy agenda, and the Congressional Web-based Education Commission, for its thoughtful look at the issues involved.

CCIA and its members support the Web-based Education Commission recommendations, as well as the Administration's pledge to increase federal funding to create a first class education system tailored to meet the demands of the emerging networked world. Clearly, increased access to, and better use of technology is just one element of what must become a comprehensive reform plan. While America is clearly the leader of the new global economy, this could change if we don't make significant improvements to our education system.

CCIA and other Washington-area tech industry leaders know that one key to improving education is a tool that has been under utilized by the vast majority of educational institutions in this country: the Internet. The advantages that network-based technologies offer – in terms of cost savings, quality of content, and accessibility are widely recognized and accepted by business and consumers throughout the world. There is no reason for the education community to be left behind.

By ensuring that technology is an integral tool for education, and committing the resources needed to ensure equitable access to learning opportunities, America can begin to reverse poor educational performance in its schools, and better utilize the intellectual capital that is so vital to our nation's continued economic success.

Bush Administration Proposals

> *Technology must be integrated into our classrooms in ways that will help increase student achievement. When technology is properly incorporated into our classrooms, more students will develop the skills it takes to succeed in the modern workforce. And American companies will finally be able to look within our own nation to find the high-tech employees they need.*
>
> - **Roderick Paige**
> **Secretary, U.S. Department of Education, 2/18/01**

The first goal of President Bush's education reform package is to close the achievement gap. The latest National Assessment of Education Progress statistics reveal staggering inequities in academic ability. Some 73 percent of white students performed at or above the basic level, compared to 40 percent of Hispanic students and 36 percent of African American students.

Today in the U.S., approximately 70 percent of 4th graders in the poorest schools cannot read; high school seniors trail their peers overseas on international math tests; and one-third of U.S. college freshmen must complete remedial courses before they can enroll in regular college-level coursework.

The shortcomings of our education system, so evident in K-12 and beyond, are adversely impacting America's ability to maintain a skilled workforce. Because the global economy will rely on workers equipped with advanced technological skills, both blue and white-collar workers can expect to be required to operate efficiently in a networked environment. Developing better technology skill sets in K-12 and beyond will therefore be necessary not only for those pursuing degrees in higher education, but for those moving directly into the workforce.

To maintain its economic leadership role, the United States must be prepared to do a better job developing its intellectual capital by making the systemic education reforms that will fully prepare our children to compete in the global economy.

While CCIA supports the call for a concentrated effort to improve fundamentals in reading, writing, science and math, it also recognizes that to accomplish this goal, it will be necessary to utilize and increase access to the benefits of technology.

Strengthening Math and Science

The imperative to revamp math and science curricula at all levels of our educational system is crucial. It is in the areas of math and science that web learning has the greatest potential. Too often, class size and traditional classroom methods prohibit a student from learning at an individual pace, creating situations when children are unable to keep up, and thus, left behind. Clearly, this is an unproductive learning environment, leading to frustration and under-achievement. Contrary to traditional teaching methods, web learning allows for a self-paced learning environment in which students receive immediate, individual feedback – enabling them to concentrate on trouble areas without the potential stigma attached to a traditional classroom environment.

Web learning can also help math and science teachers improve their effectiveness. By immediately identifying problem areas and patterns – teachers can revise and concentrate lesson plans and individual attention where needed.

Disparities in math and science comprehension persist on a global level. According to Department of Education statistics, out of 21 countries, the United States placed 19th on international math assessments, outperforming only Cyprus and South Africa. Students in the Czech Republic, Slovenia, Lithuania, and the Russian Federation surpassed American high school seniors in the same assessment tests. In science, U.S. high school seniors ranked 16 out of 21 countries. In physics, they ranked last. (*See Appendix A*).

To reverse this trend, President Bush has proposed establishing a $1 billion Math and Science Partnership Fund. The intention of the fund is to improve K-12 math and science programs by improving elementary and secondary school recruiting methods for math and science majors. By providing financial incentives and loan relief, the Administration's initiative can encourage more students to pursue math and science degrees. Proposals to provide additional college aid to students who take advanced courses in math and science will strengthen tomorrow's workforce and continue America's competitive advantage in the global economy.

Case Study: California's High Tech High School

A model charter school in Napa, California as part of an effort to start ten new High Tech High Schools throughout California. Each school receives a one time matching grant of $2 million for start-up expenses, with private sector companies making significant donations of equipment, software and services.

The High Tech High School in Napa provides a rigorous curriculum with an emphasis on science, math and engineering, as well as college preparation. Technology is integrated throughout the curriculum and is a fundamental tool for both teaching and learning. The student to computer ratio in the Napa school is one-to-one, with students learning on-the-job through internships with area high-tech companies. After four years of operation, SAT scores were 16.5% higher than the state average, and 14% higher than the national average.

Education Technology Fund

The Administration's education reform package recognizes the need to shift towards a more web-centric curriculum by proposing a $3 billion Education Technology Fund. Federal support can spearhead all-important state action in improving access to virtual learning environments along with improving the speed and quality of access to the Internet. Through cooperation with state authorities, local districts will be able to determine the best and most relevant education technologies for their students while meeting national standards. The Education Technology Fund can support research and development of high quality, online educational content and promote advancements in anytime, anywhere, any-pace learning.

The Internet is not only changing the way we live our lives, it is changing the way people of all ages and backgrounds learn. Investing in a new framework can help educators maximize the benefits of Internet technology in the classroom by using new tools to support and measure learning gains.

Education: Digital Divide v. Digital Opportunities

As the United States and the rest of the world progress towards an Internet-dominated information age, unequal access to computing and the Internet will cause the disparity among various populations to grow. This scenario is as true in the education environment as it is at home and in the business world.

CCIA has long recognized the inequities created by the digital divide and its members have actively worked to diminish the technology gaps that exist in our society.

Through numerous public and private initiatives, the United States has made significant headway in bringing access to computing technology to schools throughout the nation. Schools are rapidly being equipped and wired, with nationwide statistics showing tremendous results.

Case Study: NetDay Spearheads Internet Access in Schools

Founded five years ago, NetDay is a national, education technology nonprofit supported by the IT industry and thousands of volunteers. The original goal of the organization was to leverage a vast array of resources to wire every school and classroom to the Internet. When NetDay held its first "electronic barnraising" event in California, only 14% of schools and 3% of classrooms were wired. On this first day, over 50,000 volunteers wired 1/3 of the schools in California. Since then, NetDay wiring events have continued to take place around the country and the world.

According to a NetDay survey released in March 2001, 97% of teachers surveyed said they had Internet access in their schools and 80% had connections in classrooms. Eight out of ten teachers also believe that computers and access to the Internet improve the quality of education. However, two-thirds of teachers agree the Internet is not well integrated into their classrooms and only 26% of them feel pressure to use it in learning activities.

While progress towards achieving full connectivity will continue, and no doubt will be achieved, without concurrent development of meaningful web-based content, we will not be making the most of a resource with unlimited educational potential. To truly make headway in closing the digital divide, we must recognize that connectivity is not the ultimate goal, but rather, a method for enabling access to meaningful web-based educational content.

Therefore, resources must be spent with an eye towards maximizing the full potential of the Internet. To that end, making the best IT decisions for our schools means more than providing hardware and broadband access, but must include development of web-based educational content.

CCIA believes federal leadership is the catalyst needed to put all of our nation's schools in a position to make Internet technology work for them – and fully realize the promise of web-based opportunities in education.

Allocating Funds for "Instructional Technology"

For the most part, public and private instructional technology initiatives have concentrated on providing computer hardware to classrooms. Not only is this insufficient for fully capitalizing on web-based learning opportunities, it can become a significant drain on available resources.

The International Data Corporation (IDC) projects that public school spending on instructional technology will increase over 130% between 1998 and 2003 to $6.8 billion.

This increase in spending for technology will greatly outpace the growth in the student population. Because instructional technology includes spending on computer hardware, software and supplies, computer training, services and support, and online services – the amount of overall spending really doesn't tell us if this money is being spent wisely.

According to Market Data Retrieval (MDR), 69% of school instructional technology budget allocations are being spent on hardware, followed by 17% on software, and 14% on staff development. Clearly, these are important and necessary categories for investment – yet the numbers tell a story about hidden technology costs.

Instructional Technology Spending in School Districts

Category	Cost per Student	Total (in Millions)	Percent of Total
Hardware	$ 82.26	$3,800	68.6%
Software	$ 20.27	$ 951	17.2%
Staff Development	$ 16.69	$ 785	14.2%
Total	**$119.22**	**$5,536**	**100%**

Source: Market Data Retrieval, Teachers Use of Technology Increases as the Internet Permeates Schools

By not taking full advantage of the Internet, it's easy to see how schools can get bogged down with expensive hardware and software, continual upgrades, expensive technical support, and a constant need for teacher re-training. CCIA strongly believes that while all of these expenditures are a necessary part of the equation, to realize the benefits of a web-based education environment, we must also provide the resources needed to continue broadband deployment and the development of web-based content.

The Network Computing Solution

Before decisions are made on how new federal dollars are spent to improve education, it is imperative that there be a full examination of how Internet technologies can save money while providing the best in educational resources.

A network-computing model for education envisions a system in which teachers, administrators, students and communities will all have tools to enable access to information, web learning, peers, parent-teacher communities, and greater learning opportunities - anytime, anyplace, by anyone, on any device. This anytime/anywhere computing model relies upon an open systems architecture in which information is accessed and delivered via the Internet. Using this open systems model, reliable, manageable and secure web-access is available to every user. This model offers not only accessibility, but distinct economic advantages in the form of reduced costs and increased access for students, and therefore should be of vital importance to educational institutions.

In order for the web to truly reach its potential as a learning tool, it must have the specially designed educational content "portals" which teachers and students will find both valuable and easy to use. These education portals are web sites that provide organized access to the Internet and the delivery of services specifically tailored to the needs of the education community. Portal computing allows schools to lease access to sophisticated computing applications that are made available via the web – thereby freeing them from huge investments in hardware and technical support.

By building a portal computing infrastructure and outsourcing a school's IT needs, schools and school districts can expedite the deployment of technology while reducing overall costs for schools. The service provider model concentrates all specialized technical activity at a district level data center where technical resources can be concentrated.

Case Study: Carrollton City, Georgia Schools Adopt Web-based Learning Environment

The Carrollton City school district includes three schools and 3500 students. Using a fiber-optic network to connect the schools and enable communications among the more than 1200 PCs in classrooms, library media centers, and computer labs, the district's technical support and financial resources were becoming over taxed.

Carrollton City schools, needing a solution that would keep total costs under control, began considering alternatives that would help them move toward their vision of a Web-based environment – eventually selecting a "thin client" model for their next generation desk-top solution.

With the thin client appliance, all applications run on a scalable central server, with the simple desk-top client used only for input and output – no longer requiring a hard drive, software and ongoing maintenance. Students and teachers at Carrollton now use "smart cards," similar in size to a credit card, which allows instant access to personal work sessions from any thin client appliance on the school district's network. This portability allows for anytime, anywhere computing – at significant cost savings, as the thin client appliances require no administration and no upgrades.

Through its deployment of state-of-the-art technology, the Carrollton City school district is offering its students access to the most advanced learning environment now available. With the advent of educational portals, this environment will be further enhanced.

With computing becoming a "utility," and educational portals delivering functionality over the web, the economics for the education community can change. A high maintenance, fixed cost, depreciating infrastructure can become a maintenance-free, variable cost and easy to use environment ... one that levels the playing field for education, and enables educators and students to focus purely on educational matters.

The service provider business model is an effective, cost-saving tool that schools worldwide can implement.

Beyond Traditional Classrooms

All too often, the focus of public education efforts is geared entirely towards the traditional classroom, thereby overlooking the importance of opportunities for continuing education and worker retraining. Here, too, the Internet plays a vital role. When the Internet becomes available to everyone, then online training and access to the most effective resources and the most advanced courses will be available to anyone, anywhere, on any device. No longer will sophisticated computer skills be needed to take advantage of technology – as web-based devices become as easy to use as the telephone is today.

Advances in both wireless and fiber optic technologies are making distance learning an option in more and more homes. Building cellular relay stations is a key component of continued expansion of the world's broadband infrastructure, and will enable remote areas to take advantage of a telecommunications network that is focusing more and more on wireless phones, two-way pagers, thin clients, and other handheld devices.

Again, to truly maximize the benefits of the Internet for worker training and distance learning, the digital content must be available. Via education service providers, individuals will have access to education resources from anywhere on the globe. With the development of customized education portals, the presentation of content can be personalized to serve individual needs.

Case Study: Carnegie Technology Education Builds Unique Distance Learning Program

Carnegie Technology Education (CTE), a wholly owned, non-profit subsidiary of Carnegie Mellon University, offers a distance learning program that differs from most. Instead of enrolling individual students in online courses, CTE collaborates with community colleges, government agencies, business and other institutions to leverage each other's strengths to train a diverse population of students by providing cutting-edge online curriculum.

CTE, through its central database, serves as a central repository for all information including homework, student-teacher correspondence, grades, online tools and educational support including texts, demonstrations, etc. The Web server facilitates the exchange of information between students, teachers and CTE staff over the Internet.

Although it does not provide instructors, CTE offers extensive support through its online tools. Students, meanwhile, do all of their work over the Web – with CTE continually evaluating the information stored in the database to fine tune both the curriculum and the teaching process. Through the distance learning program, students can earn two levels of certification: computer programming and software systems development.

By partnering with other institutions and using high-performance, scalable computing technologies, CTE is providing low-cost, high-quality software development training to students around the world – and demonstrating the merits of its unique distance learning approach.

Making the most of our educational resources is the key to building the skilled domestic workforce necessary to ensure America's economic future. The growth of the network-centric education model will allow university-level opportunities to be available to everyone, regardless of physical location, budgetary, or time constraints.

Web-based Commission Recommendations

Since issuing its report in December 2000, the bipartisan Congressional Web-based Education Commission Report has received significant scrutiny and widespread support. CCIA strongly supports the goals of the Commission – and believes that the parallels between the Commission's recommendations and the Administration's announced education goals should put both branches on the same path towards maximizing the benefits of web-based learning. We believe it is especially important to the future of web-based education that policymakers follow the Commission's call to create policies that will expand access to broadband, and encourage the development of quality digital content for education.

The Web-based Commission calls on federal and state governments to make the extension of broadband access for all learners a central goal of telecommunications policy.

Aggressive deployment of broadband technologies is a necessity if the goal of closing the digital divide is to be achieved. In addition, expanding access will spur further competition and innovation in the development of educational resources. It is important, however, that access to a personal computer and the Internet does not become a baseline for education technology resources. The metric to measure success must shift to the ability to access web-based learning systems – including meaningful digital content.

The Web-based Commission calls upon the public and private sectors to join forces in developing high quality content and applications for digital learning.

CCIA strongly supports the Commission's recommendation that the federal government articulate content development priorities and provide seed funding for high need areas – thereby encouraging collaboration and partnerships between the public and private sectors in the development and distribution of high quality online materials.

Without the development of dedicated education portals, committed to the highest standards in education, the power of the Internet for educational purposes will remain unfulfilled.

The Web-based Commission has also called for stepped-up "training and support for educators and administrators at all levels." While this is always important, we believe that one of the most compelling points in favor of the network-centric education model is that teachers would no longer be required to double as IT professionals. Technology would be handled at the "back-end," at the school district level.

As Web-based education evolves, teachers will be able to free themselves to teach and students to concentrate on learning, with sophisticated computer skills not needed to take advantage the web.

CCIA Policy Recommendations

1. Endorse the Concept of Web-Based Learning

CCIA urges the education community, first and foremost, to endorse the concept of genuine web-based computing. This bedrock of support would provide the catalyst needed to influence schools and institutions of higher learning on the important IT decisions facing them.

CCIA has endorsed the congressional Web-based Education Commission's call to "revise outdated regulations that impede innovation and replace them with approaches that embrace anytime, anywhere, any pace learning," and to make "powerful new Internet resources, especially broadband access, widely and equitably available."

2. Support Investments in Web-based Computing Infrastructure and Content

Because schools lack the resources to invest in web-based learning technologies, the government should adopt policies that encourage investment into both infrastructure and web-based content. Without widespread access and use of dedicated education portals, the power of the Internet will remain unfulfilled.

3. Funding Recommendations

Currently two-percent of all public education dollars – federal, state and local – are budgeted for technology. CCIA advocates an increase of this funding to five-percent.

CCIA is specifically advocating a federal allocation of $175 million to fund model digital schools that would implement the vision of the Web-based Commission. Digital school funding would be in three phases:

- **Phase 1:** Create a National Digital School District Initiative as part of the reauthorization of the Elementary and Secondary Education Act. Fifty-one school districts would be funded, one in each state and the District of Columbia, based upon a competitive grant process. The program would be authorized at $100 million for Phase 1.
- **Phase 2:** A second round of funding, at $50 million, would create 51 additional Digital School Districts; with states and the District of Columbia being required to match funds.

- **Phase 3:** Provide $25 million in grants to schools of education to research the effectiveness of how technology is being used in National Digital School Districts.

- The total federal commitment would be $175 million – with the benefit of 100 new school districts serving as resources and demonstration centers. These schools would provide tangible examples of how technology can improve education, achieve cost savings, and deliver education in ways currently not imagined.

Funding at this level would be sufficient to equip public schools with the necessary technology, as well as providing adequate seed money to encourage the development of meaningful web-based educational content.

These model schools, located in urban and rural areas throughout the nation, would become fully functional centerpieces for web-based learning – allowing area educators to become acquainted with the concepts and practical applications of e-learning.

With this modest financial commitment, the federal government could become the catalyst for the growth of web-based education – a model for true educational reform.

Appendix A

Figure 1.—Average mathematics and science achievement of eighth-grade students, by nation: 1999

MATHEMATICS	
Nation	Average
Singapore	604
Korea, Republic of	587
Chinese Taipei	585
Hong Kong SAR	582
Japan	579
Belgium-Flemish	558
Netherlands	540
Slovak Republic	534
Hungary	532
Canada	531
Slovenia	530
Russian Federation	526
Australia	525
Finland[1]	520
Czech Republic	520
Malaysia	519
Bulgaria	511
Latvia-LSS[2]	505
United States	502
England	496
New Zealand	491
Lithuania[3]	482
Italy	479
Cyprus	476
Romania	472
Moldova	469
Thailand	467
(Israel)	466
Tunisia	448
Macedonia, Republic of	447
Turkey	429
Jordan	428
Iran, Islamic Republic of	422
Indonesia	403
Chile	392
Philippines	345
Morocco	337
South Africa	275
International average of 38 nations	487

SCIENCE	
Nation	Average
Chinese Taipei	569
Singapore	568
Hungary	552
Japan	550
Korea, Republic of	549
Netherlands	545
Australia	540
Czech Republic	539
England	538
Finland	535
Slovak Republic	535
Belgium-Flemish	535
Slovenia	533
Canada	533
Hong Kong SAR	530
Russian Federation	529
Bulgaria	518
United States	515
New Zealand	510
Latvia-LSS[2]	503
Italy	493
Malaysia	492
Lithuania[3]	488
Thailand	482
Romania	472
(Israel)	468
Cyprus	460
Moldova	459
Macedonia, Republic of	458
Jordan	450
Iran, Islamic Republic of	448
Indonesia	435
Turkey	433
Tunisia	430
Chile	420
Philippines	345
Morocco	323
South Africa	243
International average of 38 nations	488

Average is significantly higher than the U.S. average
Average does not differ significantly from the U.S. average
Average is significantly lower than the U.S. average

[1]The shading of Finland may appear incorrect; however, statistically, its placement is correct.

[2]Designated LSS because only Latvian-speaking schools were tested which represents 61 percent of the population.

[3]Lithuania tested the same cohort of students as other nations, but later in 1999, at the beginning of the next school year.

NOTE: Eighth grade in most nations. See NCES (2000) for details.
Parentheses indicate nations not meeting international sampling and/or other guidelines. See NCES (2000) for details.
The international average is the average of the national averages of the 38 nations.

SOURCE: National Center for Education Statistics, U.S. Department of Education. (2000). *Pursuing Excellence: Comparisons of International Eighth-Grade Mathematics and Science Achievement from a U.S. Perspective, 1995 and 1999.* NCES 2001-028. Figure 2. Washington, DC: U.S. Government Printing Office.